DESIGN AND DEVELOPMENT OF MIMO ANTENNA FOR POINT-TO- POINT APPLICATION

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“To my beloved parents, Ghanim and Shereen,

who have sacrificed so much for me.

To my sister Marwa,

who have been role model to me all of my life.

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ABSTRACT

A Multiple-Input-Multiple-Output (MIMO) Microstrip Patch Antenna 4 ports has been designed and implemented. The proposed antenna consists of four ports and a four Array Microstrip Patch Antenna ground plane extruded on the substrate. The overall size of the proposed substrate is $220 \times 220\ mm^2$. The antenna is fabricated on an inexpensive FR4 a dielectric constant of$\varepsilon_r = 4.5$, loss tangent of tan δ=0.019, with thickness of substrate that is 1.6-mm and the thickness of patch is *0.035 mm*. The measured results represents that the proposed antenna obtained a reasonable bandwidth from 2.4 GHz that could cover point-to-point application defined by 10-dB return loss. Furthermore, The S-Parameters of antenna are simulated and measured. In this project, design structure of the MIMO antenna four ports and substrate has been employed to broaden the bandwidth. Since MIMO antenna, high gain and directivity can be achieved. Simulation by using CST microwave studio program and measurement on the final prototype antenna were carried out and compared. A MIMO system characteristic evaluation of a four port MIMO antenna operating at 2.4GHz is performed. A four port antenna operating in point-to-point applications is designed, the antenna shows good pattern diversity low correlation coefficient.

ABSTRAK

A Multiple-Input-Multiple-Output (MIMO) Mikrojalur Patch Antena 4 pelabuhan telah dirancang dan dilaksanakan. Antena yang dicadangkan terdiri daripada empat pelabuhan dan empat Array Mikrojalur Patch Antenna satah bumi tersemperit pada substrat. Saiz keseluruhan substrat yang dicadangkan adalah 220 × 220 mm 〖〗 ^ 2. Antena ini direka pada FR4 murah yang ofε_r dielektrik berterusan = 4.5, kerugian tangen daripada tan δ = 0.019, dengan ketebalan substrat iaitu 1.6 mm dan ketebalan patch adalah 0.035 mm. Hasil diukur mewakili antena yang dicadangkan diperolehi lebar jalur yang munasabah daripada 2.4 GHz yang boleh meliputi titik-ke-titik permohonan ditakrifkan oleh 10 dB kerugian pulangan. Tambahan pula, The S-Parameter antena adalah simulasi dan diukur. Dalam projek ini, struktur reka bentuk antena MIMO empat pelabuhan dan substrat telah digunakan untuk meluaskan jalur lebar. Sejak MIMO antena, keuntungan tinggi dan directivity boleh dicapai. Simulasi dengan menggunakan CST program studio gelombang mikro dan pengukuran pada antena prototaip akhir telah dijalankan dan dibandingkan. Sistem MIMO penilaian ciri empat pelabuhan MIMO antena beroperasi pada 2.4GHz dilakukan. Sebuah antena empat pelabuhan yang beroperasi di titik-ke-titik aplikasi direka, antena menunjukkan kepelbagaian corak baik pekali korelasi yang rendah.